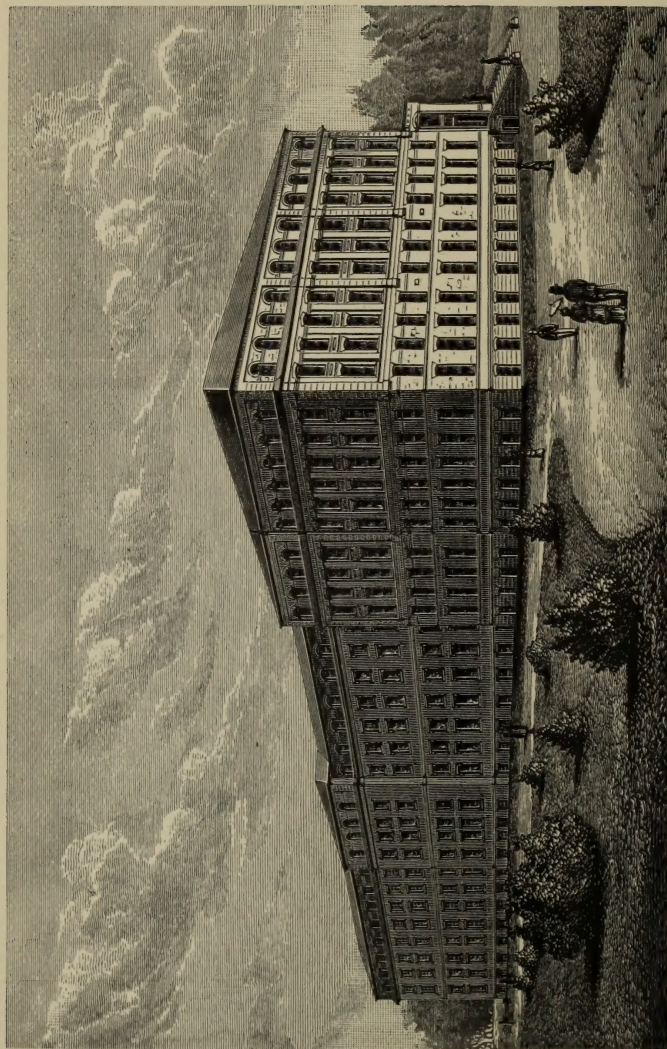


Walter Tuxen.



MUSEUM BUILDING SEEN FACING THE NORTHWEST CORNER.

ANNUAL REPORT
OF
THE CURATOR
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY
AT HARVARD COLLEGE,
TO THE
PRESIDENT AND FELLOWS OF HARVARD COLLEGE,
FOR
1879-80.

CAMBRIDGE:
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1880.

REPORT.

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE:—

It is now twenty years since the foundation of the Museum. During that time the Museum building has more than trebled in size, and its collections are unsurpassed in some departments. Thanks to the active co-operation of the assistants, the large collections have been kept in excellent order, and rapid progress has been made in the arrangement of the rooms intended for public exhibition. With the present additions to the building it will become possible to complete the exhibition-rooms containing the Zoölogical collection, and to begin in the course of two or three years the arrangement of the Palæontological exhibition-rooms.

Although I gave the plans proposed for the completion of the northern wing of the Museum, and of the northwestern corner-piece in 1875, yet these have from various causes undergone very important modifications, so that at the risk of some repetitions I here give the final plans as they have been adopted, and from which the wing building has been completed, and the northwestern corner-piece begun during the past year.

The changes in the plans are mainly due to the incorporation of the building of the Peabody Museum with the building originally planned for the Museum, and to the modifications involved in the limitations laid upon the space to be devoted to exhibitions. The explanations of the plans will show the general distribution of the available space which leaves full freedom for the development of any branch of the Museum by its simple removal to a new section of the building as soon as it has outgrown the limits assigned to it here.

In the north wing, which is now completed, the basement will be devoted to the storage of the alcoholic collections, intended for specialists, and to suitable workrooms for the assistants. The first story will contain the Synoptic room, the Palæontological exhibition-rooms, and the storage-rooms for Palæontology and Geology. The gallery floor of the first story will contain the workrooms for the assistants and specialists in Geology and Palæontology, as well as the rooms devoted for the present to Comparative Anatomy. The second story and its gallery is entirely devoted to exhibition-rooms, containing the Systematic and Faunal collections; while the mansard story contains the Entomological Department with its workrooms, the Conchological Department, and the storage and workrooms devoted to Birds, to Mammals, to Radiates, and to Articulates, into which specialists will be admitted under the supervision of the Museum assistants.

In the northwestern corner-piece there will be only three exhibition-rooms, one Faunal room devoted to Europe, and two large rooms intended for the Atlantic and Pacific Oceans. Three large laboratories adjoining the palæontological and geological workrooms of the assistants, will be devoted to undergraduates and students in Geology and Palæontology.

Three similar laboratories will be devoted to Biology, the materials for study to be drawn either from the alcoholic and other stores of the Museum, or from the vivarium and aquarium which are to occupy the greater part of the basement of the corner-piece. In the former we shall hope to keep an ample supply of all the common types necessary for dissection and for embryological study, such as frogs, salamanders, guinea-pigs, fowls, rabbits, etc., while it is proposed to keep the large aquarium well stocked with the principal fresh-water and marine animals. The proximity of Cambridge to the sea will make it a comparatively easy task to supply the aquarium not only with the marine animals common on the north of Cape Cod, but also those of its southern shores. I anticipate no difficulty in keeping a supply of marine animals not only for demonstration, but also for original work, hoping thus to do away with much of the desultory work unavoidable for those who pass their summers on the seashore. I do not, of course, propose to replace observation in the field to the original investigator by this means, but I do hope by bringing the larger number of our marine animals within the reach of the

students during their winter course of instruction, together with books, apparatus, etc., then in use to simplify work, both for pupil and teacher, and to lessen the strain which the summer schools bring upon our already overburdened instructors.

The Aquarium room is large enough not only to supply this need, but also to give excellent facilities for following out any special line of investigation in the Anatomy or Embryology of our marine animals, under the very best circumstances.

To facilitate the working of the establishment, a small gas engine will supply the necessary power for the elevators and the pumping of the water for the aquarium.

The gallery floor of the first story will contain the Curator's room, and the Library rooms, which will have in addition to the reading-room a shelving capacity of 50,000 volumes, exclusive of the special libraries in the rooms of the assistants. In the mansard there will be a couple of rooms intended for the artist of the Museum, or for special investigations, and a large lecture-room, with a seating capacity for 325 persons.

The want of proper accommodations for the instruction of undergraduates and other classes in the Museum is becoming a very serious matter, but it is hoped that the needed room in the addition to the new building will become available before the evil becomes intolerable.

Instruction has been given at the Museum by Professors Whitney, Shaler, Farlow, Dr. James, and by Messrs. Faxon, Mark, Davis, and Wadsworth. For the details of the courses I would refer to the special reports of Professors Whitney and Shaler, and to the detailed report on the Biological courses prepared by Dr. Farlow and Mr. Faxon.

The collections of the second Blake Expedition to the Caribbean Islands have been sent for final revision to Messrs. Milne-Edwards and Perrier of Paris, to Dr. Steindachner, Professor O. Schmidt, Dr. Ehlers, Professor Carus, Sir Wyville Thomson, and Messrs. Brady. The collections of bottom samples have been sent to Mr. John Murray of Edinburgh for examination.

Materials have also been supplied from our collections for study to Professor Schwalbe of Jena. A selected collection of Echini was sent to Dr. H. Ludwig to assist him in preparing a new edition of the Echinoderms of Bronn's Thierreich. A collection of Trichoptera has been sent to Mr. R. M'Lachlan of London, one

of Staphylinidæ to Mr. Fauvel, and one of Brenthidæ to Mr. Power for identification and publication with other material.

The second and concluding Part of the Final Report on the Sponges of the "Blake" by Professor Oscar Schmidt of Strasburg has been published. It forms a quarto Memoir of sixty pages, handsomely illustrated by five Plates.

Dr. Steindachner has continued his descriptions of Fishes from South America, based in great part on the Collections of the Museum, in the Proceedings of the Vienna Academy.

The collection of the Echini of the "Challenger" Expedition, entrusted to me for description, has been returned to England this spring, and I have forwarded the final Report to Sir Wyville Thomson, together with the complete edition of sixty-five Plates illustrating this Memoir.

The Museum publications have been more than usually important and numerous.

The Bulletins contain contributions to the Natural History of the depths of the sea, by Messrs. Pourtalès, Lyman, Dall, and myself. In addition there have been published papers by Messrs. Faxon, Fewkes, Allen, and Wadsworth on Crustacea, Siphonophoræ, Bats, and Lithology.

The Report on the Florida Reefs, prepared by Professor Louis Agassiz for the Superintendent of the Coast Survey, has been published as one of the Museum Memoirs. It is finely illustrated by lithographic plates, drawn many years ago by the late A. Sonrel.

In connection with Professor Whitney the Museum has also completed the Auriferous Gravels of California, completing Vol. VI. of the Memoirs, fully illustrated with plates, maps, and heliographs of scenery.

No. 2 of Vol. VII. of the Memoirs, "Climatic Changes of Later Geological Times," also published in connection with Professor Whitney, is well advanced.

The increase of the Library has been large, and our exchanges continue on a satisfactory footing. The total number of volumes now in the Library exclusive of pamphlets is over 14,000. Nearly 800 volumes were added during the past year, and about 1300 pamphlets and parts of volumes.

The special Reports of the assistants give the details of the departments in their charge. The work on the collection of

Worms, in charge of Dr. Mark, has been limited to the necessary care of the specimens and to short studies of some of the parasitic worms added to the collections during the past year. As soon as the collections of Annelids sent for identification to Europe have been returned a more detailed report of the collection can be made.

The most important additions during the past year have been the collection of Palæozoic Fossils purchased from Messrs. Dyer, Walcott, and Gebhard. The Dyer collection filled no less than 200 boxes besides a few large slabs. It has been brought together by Mr. Dyer during the past twenty years, and is an unrivalled collection of Invertebrates mainly from the Cincinnati group.

The Walcott collection represents mainly the Trenton limestone, and is specially rich in Trilobites. The material upon which Mr. C. D. Walcott based his important investigations on the structure of Trilobites forms a part of this collection.

The Gebhard collection is an important one in the palæontological history of the State of New York. It is the result of the work of three generations, Mr. Gebhard, from whom the collection was purchased, having materially increased it as he received it from his grandfather through his uncle, both of whom were zealous collectors of the fossils in the vicinity of Schoharie.

A beginning has also been made to supply our deficiencies of North American Vertebrate Fossils. Mr. Garman spent some time at the west, and brought back an excellent collection of Tertiary Vertebrates, mainly from the Bad-lands.

To supply our desiderata towards the Faunal collections now preparing of South America, India, and Africa, we have received by purchase a large number of Birds and Mammals, both skins and skeletons.

The arrangement of the North American Faunal room is practically completed, and I hope during the coming year to open the South American Faunal room to the public. The cases for the systematic collection of Molluscs have been completed, and Mr. Hamlin is now arranging the room for exhibition.

All the old exhibition-rooms have now been thoroughly repaired, and the appearance of the rooms open to the public has been greatly improved.

We have received from Mrs. T. M. Brewer the collection of birds' eggs which the late Dr. Brewer bequeathed to the Museum.

During the past five or six years Dr. Brewer constantly added to his already large collection, and thanks to his interest in our Oölogical collection it is second only, for American Birds, to that of the Smithsonian Institution.

The collection of deep-sea Invertebrates from the Western Caribbean made by Commander J. R. Bartlett of the United States Coast Survey, Steamer "Blake," while running lines of soundings during the winter of 1879-80 is an important addition to the collections made by the "Blake" in the Gulf of Mexico and from the Windward Islands. The Fauna of that part of the Caribbean does not differ from that of the Eastern portion. During the last part of June and during July Mr. Patterson, the Superintendent of the Coast Survey, placed the "Blake" again at my disposal to run lines of dredgings normal to the East Coast of the United States. The expedition was entirely successful; large and interesting collections were made during the cruise, which extended from the Northeastern edge of George's Shoal to a line east of Charleston, S. C., directly across the Gulf Stream. I have given an account of this expedition in Letter No. 4, addressed to the Hon. Carlile P. Patterson, Superintendent United States Coast and Geodetic Survey. The number of stations occupied during this cruise is unusually large, thanks to good weather and the untiring zeal of Commander Bartlett and Mr. Sharrer, the executive officer, as well as all the officers and crew of the "Blake," to whom deep-sea dredging has now become a second nature. As the northern ground covered by this expedition is the extension into deep water of the area examined by the United States Fish Commissioners, a part of the Collections has been entrusted to Professors Verrill (Cephalopods) and Smith (Crustacea). The osseous fishes have been placed in the hands of Mr. Goode for identification.

The Museum has suffered a heavy loss in the death of Mr. Pourtalès. From his early youth, first as student and afterward as colleague and scientific adviser, he had held the most intimate relations with Professor Agassiz, and had been familiar with every step in the history of the Institution founded by him. In the laboratory, in the field, on their long voyages they had worked together to one end, and long before he was officially connected with the Museum he had not only contributed largely to its collections but was identified with its general progress. Since his

appointment after my father's death as Keeper of the Museum, he has not only taken charge of his own department, but on him has devolved, during my frequent and prolonged absences, the management of the Museum and the execution of plans requiring for their success entire sympathy with the spirit in which they were conceived. I can never replace the friend who has thus, for nearly ten years, been my other self in the administration of the Museum, and the Institution would indeed be fortunate should it find in his successor the learning, the modesty, the industry, or the executive ability which, combined with his rare scientific attainments, made him invaluable in his post at Cambridge.

This is not the place to enter into any details regarding his scientific career. I may, however, recall the great influence his investigations have had upon Marine Zoölogy. Following Bailey in his microscopic investigations upon the nature of the sea-bottom on the East Coast of the United States, he extended like researches little by little, until under the enlightened support of the then Superintendent of the Coast Survey, Professor Bache, he became through his extensive dredging operations in the deep waters of the Straits of Florida (1866, 1867, 1868) the pioneer of deep-sea zoölogical explorations in America. His publications on this subject are to be found mainly in the Reports of the United States Coast Survey, in Silliman's Journal and in the Memoirs and Bulletins of the Museum of Comparative Zoölogy. The former were published while he was still an assistant in the Coast Survey. His later publications, under the auspices of the Museum, were chiefly devoted to the deep-sea corals, crinoids and polyps of the "Bibb," "Hassler" and "Blake" expeditions after he became attached to the Museum. They bear witness not only to the range of his learning but to the breadth of view which he brought to all his investigations.

ALEXANDER AGASSIZ.

CAMBRIDGE, September 1, 1880.

REPORT ON THE GEOLOGICAL DEPARTMENT.

By J. D. WHITNEY, Sturgis-Hooper Professor of Geology.

DURING the past year instruction has been given in this department as follows: The Sturgis-Hooper professor lectured through the whole college year on Economical Geology, twice a week, to students in the fourth year of the Engineering Course of the Lawrence Scientific School. Mr. Wadsworth lectured during the latter part of the year on Lithology, to an audience of teachers and professors, with an average attendance of about fourteen persons. He also gave practical instruction in Micro-lithology, through the whole year, to graduates and teachers from the Boston Public Schools.

Cases for the lithological collections, which will hold a large number of specimens, have recently been put up in the geological lecture-room, and Mr. Wadsworth has begun to arrange the material in this department, so as to make it accessible for examination and study. There have been three valuable additions made to this collection since the date of the last report. One of these illustrates a section across New Hampshire and Vermont, and was procured from Mr. Huntington; another was collected by Professor Pettee, in California; and the third by Mr. Wadsworth, in Newfoundland, and in the Carboniferous formation of Nova Scotia. About 200 thin sections have also been added during the year, mostly of rocks from Lake Superior, making the whole number available for study about 1,400.

Several collections of rocks and minerals have been examined for individuals desiring information in this department. Among these were suites of specimens from Leadville and Florissant, and a large collection made by Rev. Selah Merrill, D.D., in Palestine.

Mr. Wadsworth has devoted a large part of his time, during

the year, to the preparation of a paper on the Iron and Copper Regions of Lake Superior, which forms the first number of the first volume of the Geological Series of the Bulletin of the Museum. It contains 157 pages, and is illustrated by six plates.

The time of the Sturgis-Hooper professor has been chiefly occupied in continuing the publication of the "Auriferous Gravels of the Sierra Nevada," which is now completed, forming Vol. VI. No. 1 of the Memoirs of the Museum, and containing xvi and 569 pages, with twenty-four illustrations, — maps, plates of sections, and heliographs of scenery, — and two large folding maps, one of which is in two sheets. This work, with the Memoir of Mr. Lesquereux on the fossil plants of the same formation, completes the sixth volume of the Memoirs.

It was the intention of the Sturgis-Hooper professor to include within the volume on the gravels an account of the glacial and surface geology of the Sierra Nevada; but finding the work likely to expand to dimensions too large for convenience, if all this matter were to be included in one volume, it has been divided into two portions. A memoir entitled the "Climatic Changes of Later Geological Times" has been prepared, and a portion of it (120 pages) is already in type, and will be published synchronously with the gravel volume. The remainder, which is nearly all written, will be put in type and issued during the coming winter. This work will form No. 2 of Vol. VII. of the Memoirs. It will contain a full description of the phenomena observed in the Cordilleras, indicating changes of climate during the later geological periods, followed by a discussion of the bearing of these facts on climatic changes in general, especially those which have occurred during the most recent geological epochs, and which the author believes to be still in progress.

REPORT OF PROF. N. S. SHALER ON THE INSTRUCTION IN GEOLOGY AND PALÆONTOLOGY.

THE following courses of instruction have been given by myself and by my assistant, Mr. Wm. M. Davis, instructor in Geology : —

1. A course in Physical Geography and Meteorology, three hours a week, to forty-five undergraduates. This course was given by Mr. Davis alone.

2. A course in Elementary Geology and Palæontology, three hours a week, with a parallel course in elementary field and laboratory work, to one hundred and sixteen undergraduates from various departments of the University. This course was given by myself, with the assistance of Mr. Davis.

3. A graduate course in Palæontology, open only to those who had taken courses in Elementary Geology and in Zoölogy. It was attended by six students.

4. A graduate course in advanced field-work, open to those who had taken Elementary Geology, attended by two students.

5. A graduate course in the history of geological opinions, open only to those who had the requisite knowledge of Geology and Palæontology. The course was attended by three students.

6. A summer course in field-work, designed to afford an opportunity for advanced students, to those familiar with Geological Surveying, was given upon selected localities in Virginia, Tennessee and Kentucky. Seven persons attended the instruction in this course.

My private assistant, Mr. George H. Squier, has been employed during one half the year in making collections in the field, and in arranging the collections for the use of students in Geology and Palæontology.

During the year I have made use of a small outbuilding belonging to the Museum for the purpose of doing some limited work in chemical geology and assaying. In connection with this work, two or three of the more advanced students who had acquired a general knowledge of chemistry were given some training in

ore analysis. I am satisfied that it will be well if this laboratory is maintained, so that those students who propose hereafter to devote themselves to practical geology may acquire a knowledge of the processes of assaying, and perhaps be led to a study of the problems of chemical geology. There are now half-a-dozen students in this department who are fitted by previous chemical training for such work, and who desire to pursue it.

A circular, descriptive of the several courses in this department, and in that under the direction of Professor Whitney, has been prepared by the officers of those departments, and printed by the college for the use of students.

REPORT ON INSTRUCTION IN ZOÖLOGY AT THE MUSEUM.

By WALTER FAXON, *Instructor in Zoölogy.*

DURING the winter of 1878-79, the plan of instruction in Zoölogy given at the Museum underwent a complete revision, and important changes were made in the scheme of courses. The courses as now arranged having had a year's trial, it seems a fitting time to state their scope and aims.

Four courses involving instruction in Zoölogy were given at the Museum during the past academic year : —

1. General Zoölogy (lectures). Dr. E. L. Mark.
2. Biology (laboratory work and lectures). Prof. W. G. Farlow and Dr. Walter Faxon.
3. Advanced Zoölogy (laboratory work and lectures). Dr. Walter Faxon.
4. Physiology and Hygiene (lectures). Ass't. Prof. Wm. James.

The first course is designed to meet the wants of those students who devote most of their time while in the University to other departments of learning, but who wish to become acquainted with those fundamental facts and principles of Zoölogy which at the present time it behooves every educated man to know. Hence no time is spent in this course in practical dissection in the laboratory, microscopic manipulation, or preparation of specimens. The whole course consists of two lectures a week, with demonstration from specimens on the lecturer's table.

This course was attended by 56 students.

The second course is intended for those students whose tastes incline them specially towards scientific studies. It serves as a preparation for both Advanced Botany and Advanced Zoölogy, only such as have taken it being allowed to carry their biological studies any further. It is also recommended to those who propose

to follow the medical profession in after years. Although elementary, the course is eminently practical, involving a large amount of laboratory work, use of the microscope, and mechanical preparation of specimens. The work done in the laboratory may be said to be the basis of the course, the lectures supplementary, and, as far as practicable, in direct connection with it.

For this course twelve new microscopes, of Zeiss' and Véric's make, were furnished through the liberality of Mr. Agassiz, making together with those already in the laboratory about two dozen available instruments. A good outfit of re-agents, etc., was also provided by the College.

In this course the outlines of both Botany and Zoölogy are taught by means of the study of a comparatively few forms of plants and animals selected with a view to illustrate the more important modifications of plant and animal structure.

The first academic term is devoted to the study of plants.

The instruction was given by Professor Farlow, who reports as follows:—

"The course in Biology, Natural History 5, of the undergraduate elective studies, was divided into two portions, of which the botanical portion, under my charge, was held in the Museum laboratory, beginning at the opening of the term and extending to the mid-year examinations. The number of students who pursued the course to the close of the work with me was 35. They were distributed among the several classes as follows: Seniors 8; Juniors 16; Sophomores 4; Freshman 1; Graduate 1; Scientific 1; Unmatriculated 4. Besides this number were three or four from the professional schools who attended only a portion of the course. Some delay was experienced in beginning the laboratory work in consequence of the late arrival of the microscopes from Europe; but, in the absence of microscopes, extra lectures were given so that the time of the students was fully occupied. Later in the season only one lecture a week was generally given, as it was found that the students required most of the time to enable them to perform their laboratory work thoroughly. The course began with a study of the structure of the typical vegetable cell and its principal modifications, and afterwards an attempt was made to give the students a general view of the vegetable kingdom by examining a single type of the different subdivisions, beginning with the lower forms, as yeast and the nostocs. For the study of the lower orders, living and alcoholic material was provided by the instructor, and ferns and flowering plants were furnished by the director of the Botanic Garden.

"The course for the present year was tentative, and whether a successful result was reached or not cannot be known until it shall have been seen

whether the students have been better prepared for pursuing more advanced studies hereafter. I have had reason to be pleased with the diligence and activity of the class, and feel that, although we have labored under several disadvantages necessarily attendant upon the introduction of a new course, the students have done all in their power to profit by the instruction and to make the position of their instructor a pleasant one."

The work of the term assigned to Zoölogy was begun by the study of the structure of the animal cell as shown in the tissues of the fresh-water polyp (*Hydra*). Besides seeing, describing, and drawing every point in the structure of the *Hydra*, each student is required to stain and mount on glass slides microscopic sections for permanent preservation; and these mounted preparations are taken into consideration at the end of the year, when the student undergoes examination on the work of the year.

This was followed by study of *Amæba*, *Sea-Anemone*, *Starfish*, *Lobster*, *Oyster*, and *Clam*.

By presenting to the student a few forms typical of the chief great groups of the animal kingdom, an idea is given of the most important modifications of structure. But through these few forms, naturally so widely separated from each other, the beginner is unable to take the important lesson in comparative study without which any elementary course in Natural History would seem to me grossly defective. In order to afford this lesson in the study of homologies, as complete a series of Echinoderms as possible was placed before each student, who, with a number of clearly related forms before him, is now led to determine the identical structural parts in the different forms, and to realize the fact that all these forms, superficially so different from each other, are but modifications of one type of structure.

The history of the development of three or four Invertebrates was given by means of lectures, preparations, and diagrams; and even here it was found possible in the spring of the year to demonstrate with fresh specimens many phases in the development, such as the segmentation of the egg and various stages in the larval life of the animals under consideration.

Owing to the extreme shortness of time allotted to the zoölogical half of this course, the study of a vertebrate animal, with which the course was to have closed, had to be omitted last year. Another year the plan can doubtless be carried out more nearly to meet the programme; but the instructor wishes to suggest the

advisability of making the course in Biology cover two years. This would raise the character of the advanced courses in Botany and Zoölogy, and tend to relegate them to the graduate courses.

The course in Biology last year was attended by thirty-six students (one Freshman, four Sophomores, sixteen Juniors, eight Seniors, one student in the Lawrence Scientific School, one candidate for the degree of A.M., and five unmatriculated students). Most of these students intend to study medicine.

Nine hours a week are required of each student.

The third course (Advanced Zoölogy) can be followed in the future only by those who have passed the examinations in Biology. The members of the class last year had during the preceding year taken a general course in Elementary Zoölogy, and were thus prepared to study more thoroughly certain groups of animals. The early part of the year was devoted to the study of the morphology of the class of Crustacea. The students being few in number, it was found practicable to place the amplest amount of material in their hands, and to deal with the morphological problems with a delightful freedom from diagrams and text-books. The interest shown by the students in their work was attested by the fact that some of them of their own accord embodied the results of their studies in original essays, which were presented before the Harvard Natural History Society.

The Radiates were next taken up in a similar way; and the last third of the year was devoted to the study of the development of the chick within the egg.

This course was taken by three Seniors, one Junior, and one student of the Lawrence Scientific School, — nine hours a week throughout the year.

The fourth course consists of one lecture a week on Human Physiology. It is a voluntary course, open to all students of the University. About thirty students attended the lectures during the last year.

In addition to these four courses given last year, a course in Entomology (with laboratory work), by Prof. H. A. Hagen, is offered to graduates who are properly qualified to pursue the study. This course was not given last year, having accidentally been omitted from the list of electives.

The Museum assistants are also allowed to take students specially qualified in any special department of Zoölogy or Palæontology.

REPORT ON THE MAMMALS AND BIRDS.

BY J. A. ALLEN.

MAMMALS. — The additions to this department during the year number about sixty mounted skins, representing nearly as many species new to the collection; eighty unmounted skins, sixteen skeletons, and twenty skulls. Noteworthy among these are the skeleton of a large finner whale and the skull of a hump-backed whale taken at Provincetown, a mounted skeleton of a gorilla, and finely-mounted skins of a large old male Bornean orang (*Simia Wurmbi* Owen), a hairy tapir (*Tapirus Roulini*), a young hippopotamus, a Javan rhinoceros, several large African antelopes, *Potamochoerus Edwardsi*, a proboscis monkey, and various other species of monkeys and lemurs. Quite a large number of skins previously received have also been mounted.

An important addition to the palæontological department consists of a large collection of remains of extinct mammals from the Bad-lands of north-eastern Wyoming, made by Mr. S. W. Garman, numbering not far from five hundred specimens, and representing about twenty species. The collection includes large suites of the skulls and other bones of all the more common species of the locality explored.

About one-half of the collection of alcoholic bats (numbering about six hundred specimens) has been placed in the hands of Dr. Harrison Allen for elaboration.

BIRDS. — About two thousand skins have been added to the collection of birds, two hundred of them mounted; and about four hundred have been mounted from specimens previously in the collection. About two-thirds of the additions are from South and Central America and the West Indies; the larger part of the remainder are from North America, purchased with special reference to supplying deficiencies in the North American series. The more important special collections include one hundred and

seventy specimens from Nicasio, California ; two hundred and sixty from Aspinwall, Panama ; fifty from Pernambuco, Brazil, embracing several rare species ; four hundred and twenty from various Mexican, Central American, and South American localities, selected from the duplicates of the Boston Society of Natural History, consisting to a large degree of virtually type specimens ; three hundred and fifty from the island of Grenada, W. I. ; about one hundred and twenty-five from Santa Lucia, W. I. ; and smaller lots from St. Kitts, Martinique, and Porto Rico. Nearly all, as well as the mammals, were added by purchase, and are the gift of Mr. Agassiz.

The department of Oölogy has been increased by the addition of the valuable collection of eggs left to the Museum by the late Dr. Thomas M. Brewer of Boston, numbering about three thousand five hundred lots, and not far from one thousand species. A few rare nests and eggs have been presented by Mr. H. D. Minot of Boston.

The room for the exhibition of the South American and Australian collections has been furnished with cases, to which the large amount of material already gathered for these collections will soon be removed. Two new workrooms have been completed in the attic, to which will immediately be removed the collections of Osteology and skins of birds and mammals.

Besides the identification and intercalation of the additions, a systematic catalogue of the bird skins has been begun during the last year ; and already upward of one thousand species have been critically revised or determined, covering the *Psittaci*, the *Trochilidæ*, and the *Oscines* from the *Turdidæ* to the *Icteridæ*. This catalogue, when completed, will show at a glance not only what species are in the collection, but the number of specimens of each and the localities represented. Of the considerable number of families thus far revised, about twenty to seventy-five per cent of the known species are represented, the average being not far from one-third.

In regard to the further increase of the collections, it may be added that a large order for material to complete the osteological collection, both for the mounted and unmounted series, has been placed in the hands of Prof. H. A. Ward of Rochester, fully covering the classes of mammals and birds, the order to be gradually filled as opportunity may favor.

REPORT ON THE FISHES, SELACHIANS, REPTILES,
AND BATRACHIANS.

BY S. W. GARMAN.

FISHES.

THREE-FOURTHS of the labor of the year has been done in this department. As a result, in addition to incidental work in the care of the collection, correspondence, &c., about 12,000 numbers have been added to the catalogue, all the storage cans have been overhauled, and nearly fifty large sets of duplicates made ready for shipment to correspondents. The acquisitions have been the most important for some years. Among them are several excellent skeletons of North American species, secured by purchase. A very fine specimen of *Ceratodus* was furnished by Sir Wyville Thomson. In exchange for American duplicates, we have about sixty Red Sea and Indian Ocean species; for South American duplicates, about fifty species from the Adriatic were obtained. From Professor Baird of the National Museum we have received another instalment of the series of East Coast fishes, and from the Coast Survey many deep-sea fishes, obtained by the steamer "Blake." Numerous fresh-water fishes from India and the West Indies have been secured by purchase, and by collection a number of species, with duplicates, from the Rocky Mountains. Many of the additions are rarities, and were selected for the purpose of supplying deficiencies. The larger shipments have been made to the Paris Museum, Smithsonian Institution, Butler University, Ind.; Bethel College, Ky.; Illinois Natural History Society, and Dr. Day of England. Specimens have also been sent to Sir Wyville Thomson, Dr. G. E. Manigault, the Boston Natural History Society, and others. The deep-sea fishes were forwarded to the Fish Commission. Various changes and additions have been made in the exhibition series. The selection and preparation of specimens for the rooms yet to be filled continues.

SELACHIANS.

Beyond some identifications and changes of alcohol, little has been done on the Selachians. A beautiful specimen of *Stegostoma* for the exhibition room is the most noteworthy purchase of the year. Some rare deep-water species, hitherto desiderata, have been secured by the dredging operations of the Coast Survey steamer "Blake." An examination of a greater portion of the tanks and cans discovered very little change in the condition of the specimens.

REPTILES AND BATRACHIANS.

A considerable amount of time has been devoted to the preparation of specimens for exhibition in the rooms soon to be opened. A large number of species has been secured by purchase, exchange, donation, and collecting in the field since the preceding report, many of them in the way of rarities and desirable duplicates. A tolerably complete series from the East Indies was the largest purchase. Various collectors in the West Indies have made substantial additions to the collections from their respective localities. The European correspondents of the Museum have sent valuable Asiatic, African, and European species; and from the Boston Society it has additions to the number in some species previously lacking. To the North American representation a fine lot has been added by collection in the Territories and by purchase from the Gulf States. Among the skeletons purchased there are several turtles from North America, South America, and Australia. An important series of fossil tortoises was collected in the Bad-land regions of the West. The donations include New England species in various stages of development, and of value for exhibition and exchanges.

REPORT ON INSECTS.

BY DR. H. A. HAGEN.

THERE have been presented to the Museum a large number (42) of additions, among them many biological specimens. The most important are from Dr. Fritz Mueller of Brazil ; from Dr. G. J. Engelman, St. Louis, Mo. ; from Dr. C. A. Dohrn, Stettin, a type of the parasite of the beaver (*Platypsylla*) ; from J. H. Hubbard, Detroit, Mich., *Cave articulata* ; from Dr. Ch. V. Riley, a pair of *Hornia* ; from Dr. Rougemont, Neufchatel, Switzerland, *Helicopsyche* from Naples ; from the Museum, in Tokio, Japan, a large lot in exchange.

Scientific publications, based in part or entirely on the collection of the Museum, consist of the European Trichoptera, by Mr. R. M'Lachlan, London ; the American Staphylinidæ, by Mr. Fauvel, Lille, France ; the Brenthidæ, by Mr. G. Power, Rouen, France ; and several papers by Dr. H. A. Hagen.

The condition of the collection is very satisfactory. Miss M. Clark has spread and set a very large number of specimens. The two hundred new boxes ordered for the department allowed a considerable extension of the arrangement of the insects. All the Hymenoptera are arranged, filling nearly five cabinets ; of the Hemiptera a part is arranged ; the Odonata are rearranged, and fill nine cabinets. The Biological collection is finished for the Hemiptera as far as the Cicadæ.

A large number of microscopical slides have been added to the collection.

A very remarkable lot of deformities of Coleoptera, published types, was presented by Dr. J. L. Le Conte and Dr. Horn, of Philadelphia, and by Mr. C. L. Harrison, New Haven, Conn.

The answering of scientific or biological questions on obnoxious insects has become an important work for the department. For-

merly there arrived, on the average, perhaps four letters a week ; now more than twice that number are received. At least one day a week is now devoted to answering such letters.

The Library has been increased by very valuable books. Nearly all the papers by Th. W. Harris are now in the Library, some of them being very scarce.

The collection of Brenthidæ has proved to be a very rich one. It has been examined by Mr. G. Power. It contains 306 named species. The last published catalogue by Mr. Harold counts only 276 species, of which 147 are represented in the collection. There have been placed in the exhibition room a small general systematic collection, contained in 27 large boxes, six of them containing transformations, and the North American Faunal collection in six boxes.

REPORT ON THE CRUSTACEA.

 BY WALTER FAXON.

THE whole of my time during the past year was devoted to the students of Zoölogy at the Museum. No work upon the collection of Crustacea was done, except that necessary for the preservation and storage of new collections received during the year.

As in the two preceding years, the most important additions to the collection have come from the "Blake" Expedition.

List of additions to the collection of Crustacea: —

Alex. Agassiz. Collections of the "Blake" Expedition.

K. D. Atwood. Large collection of deformed lobster claws, from Portland, Maine. (Purchased.)

E. Cole. Specimens from off St. Lucia. 278 fms.

Walter Faxon. Specimens from Newport, R. I.

J. W. Fewkes. *Phyllosoma* from Villa Franca.

S. W. Garman. *Crustacea* from the West Indies, collected 1878-79.

C. F. Gissler. *Bopyrus* parasitic on *Palæmonetes vulgaris*.

E. H. King. *Cambari* from West Liberty, Ia.

F. Lagois. Collection made at St. Barts and St. Kitts, W. I.

Edward Palmer. *Astacus*, *Apus*, *Branchipus*, *Estheria*, and *Amphipoda*, from Mexico.

H. J. Perry. *Cambarus* from Black Lake, N. Y.

B. G. Snow. Collections from Ebon, Marshall Islands, and Caroline Islands.

C. N. Willard. Small collection from Old Point Comfort, Va.

Zoölogical Station, Trieste. *Nephrops Norvegicus*.

REPORT ON THE CONCHOLOGICAL AND PALÆONTOLOGICAL DEPARTMENTS.

BY CHARLES E. HAMLIN.

DURING the year very extensive and important additions have been made, by purchase, to the collections of Fossil Invertebrata, the extent of which can at present be indicated no further than by stating the number of packages received. They are:—

Sixteen boxes specimens from the Upper Silurian and Devonian strata of Schoharie, N. Y., and vicinity, being the collection of Mr. Wm. D. Gebhard.

One hundred and ninety-three boxes specimens, and thirty-three large slabs and fragments, chiefly from the Lower Silurian of Cincinnati and other parts of Ohio, comprising the entire collection of Mr. C. B. Dyer, of Cincinnati.

Thirty-three boxes and nine barrels fossils of the Trenton Limestone and Utica Slate of Central New York, from Mr. C. D. Walcott, of Trenton Falls, N. Y.

Thirty-two species, two hundred and six specimens, invertebrate fossils from Mount Lebanon, Palestine, collected by and bought of Rev. William Bird.

As the Gebhard collection came without names, the larger part of February and March was given to the assortment of the specimens and the determination of the Mollusca from the Lower Helderberg groups and the Oriskany Sandstone.

The month of April was spent by me at Cincinnati, in assorting and packing the Dyer collection. This, and that of Mr. Walcott, remain for the present in the packages.

Considerable time has been devoted to the determination of the Mollusca of the Bird collection, and those of another, chiefly from Mount Lebanon, made by and belonging to Rev. Selah Merrill.

The selection of fossil species designed to make part of the Systematic Collection of Mollusca has been completed, and the Tertiary species have been mounted.

The difficulty of procuring suitable tablets has greatly delayed the work of remounting the recent shells set apart for exhibition in the Systematic Collection, but since the receipt of tablets the mounting has been in progress, and arrangement in the new cases will keep pace with the mounting.

Owing to the pressure of other work, conchological exchanges have been carried on only with a few old and valued correspondents. Offers of new exchanges have been necessarily declined.

Intervals of time not otherwise occupied have been given to revision of recent Lamellibranchiata, which, discontinued in 1877, was in part resumed last year.

Miss Anthony, besides her usual work of cleaning and mounting specimens, has rendered efficient help in assorting fossils.

The receipts of shells by exchange have been six packages, comprising three thousand, nine hundred and forty-five specimens of two hundred and fifteen species. Consignments sent in return have numbered five packages, one thousand, seven hundred, and forty-two (1742) specimens of two hundred and forty-eight (248) species.

REPORT ON THE LIBRARY.

BY MISS F. M. SLACK.

THE accessions to the Library during the year ending September 1, 1880, have amounted to 772 volumes, 866 parts, and 424 pamphlets, from the following sources.

	VOLUMES.	PARTS.	PAMPHLETS.
Gift	102		77
Exchange	64	230	
Purchase	249	439	104
A. Agassiz	157	187	243
Museum Publications	2	10	
Binding parts and pamphlets	198		
	<u>772</u>	<u>866</u>	<u>424</u>

The number of volumes (exclusive of pamphlets) now in the Library is 14,098.

[A.]

INVESTED FUNDS OF THE MUSEUM.

IN THE HANDS OF THE TREASURER OF HARVARD COLLEGE, SEPT. 1, 1877.

Sturgis-Hooper Fund	\$70,142.52
Gray	51,750.00
Agassiz Memorial "	{ 297,933.10
Teachers & Pupils' Fund,	
Permanent "	117,469.34
Humboldt "	7,740.66
Agassiz Building "
	<hr/>
	\$552,599.63

[B.]

FACULTY OF THE MUSEUM.

CHARLES W. ELIOT, *President.*

ALEXANDER AGASSIZ, *Curator.*

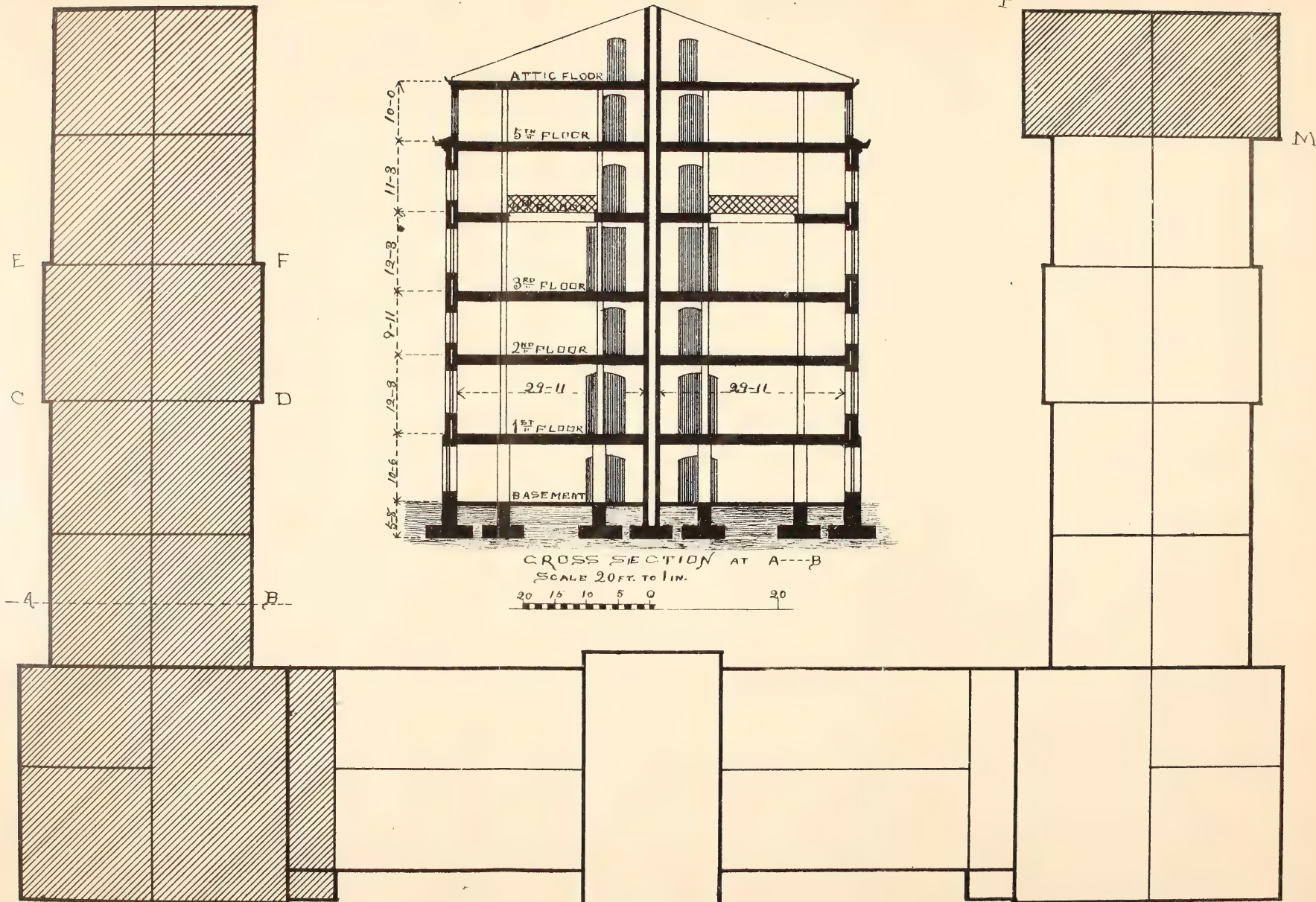
JOSIAH D. WHITNEY, *Secretary.*

THEODORE LYMAN.

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OFFICERS.

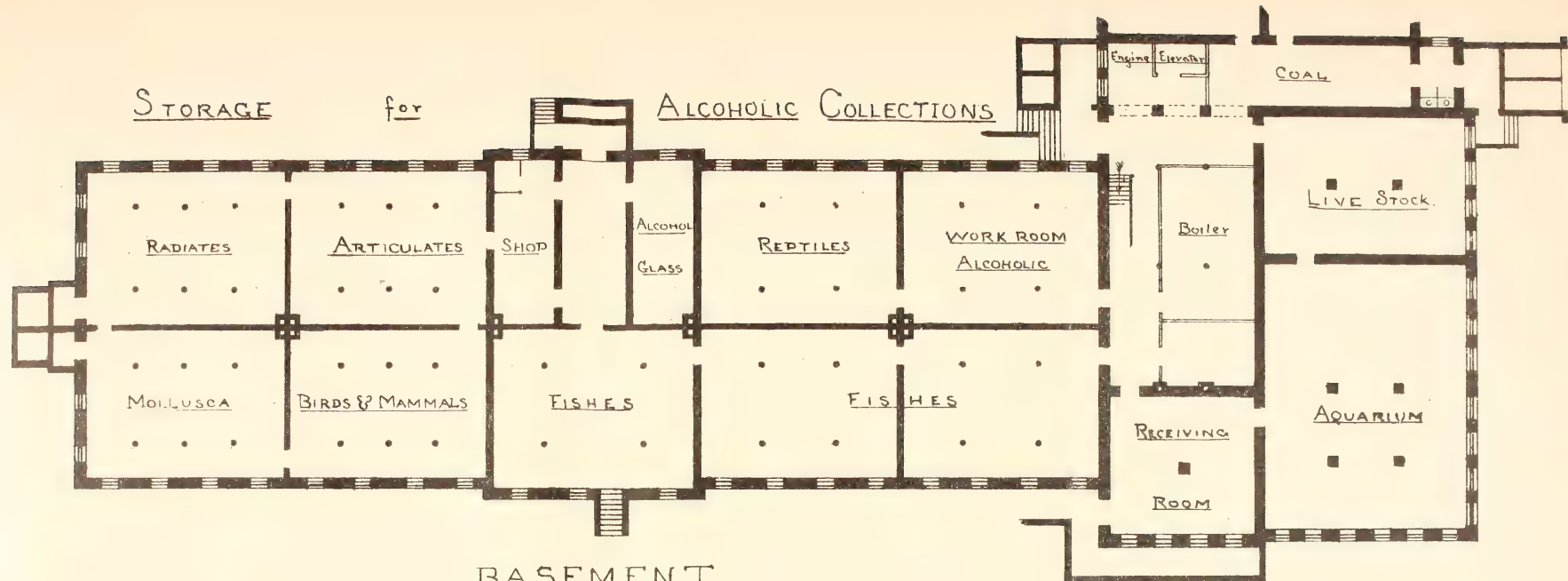
ALEXANDER AGASSIZ,	<i>Curator.</i>
JOSIAH D. WHITNEY,	<i>Sturgis-Hooper Professor of Geology.</i>
HERMANN A. HAGEN,	<i>Professor of Entomology.</i>
NATHANIEL S. SHALER,	<i>Professor of Palæontology.</i>
WILLIAM JAMES,	<i>Assist. Prof. of Physiol. and Comp. Anat.</i>
THEODORE LYMAN,	<i>Assistant in Zoölogy.</i>
CHARLES E. HAMLIN,	<i>Assistant in Conchology and Palæontology.</i>
JOEL ASAPH ALLEN,	<i>Assistant in Ornithology.</i>
WALTER FAXON,	<i>Assistant in Zoölogical Laboratory.</i>
W. M. DAVIS, JR.,	<i>Assistant in Geological Laboratory.</i>
S. W. GARMAN,	<i>Assistant in Herpetology and Ichthyology.</i>
E. L. MARK,	<i>Assistant in Zoölogical Laboratory.</i>
M. E. WADSWORTH,	<i>Assistant in Lithology.</i>
J. W. FEWKES,	<i>In charge of Radiates.</i>
PAULUS ROETTER,	<i>Artist.</i>
MISS F. M. SLACK,	<i>Librarian.</i>



The Halotype Printing Co. 211 Tremont St. Boston.

PLATE I

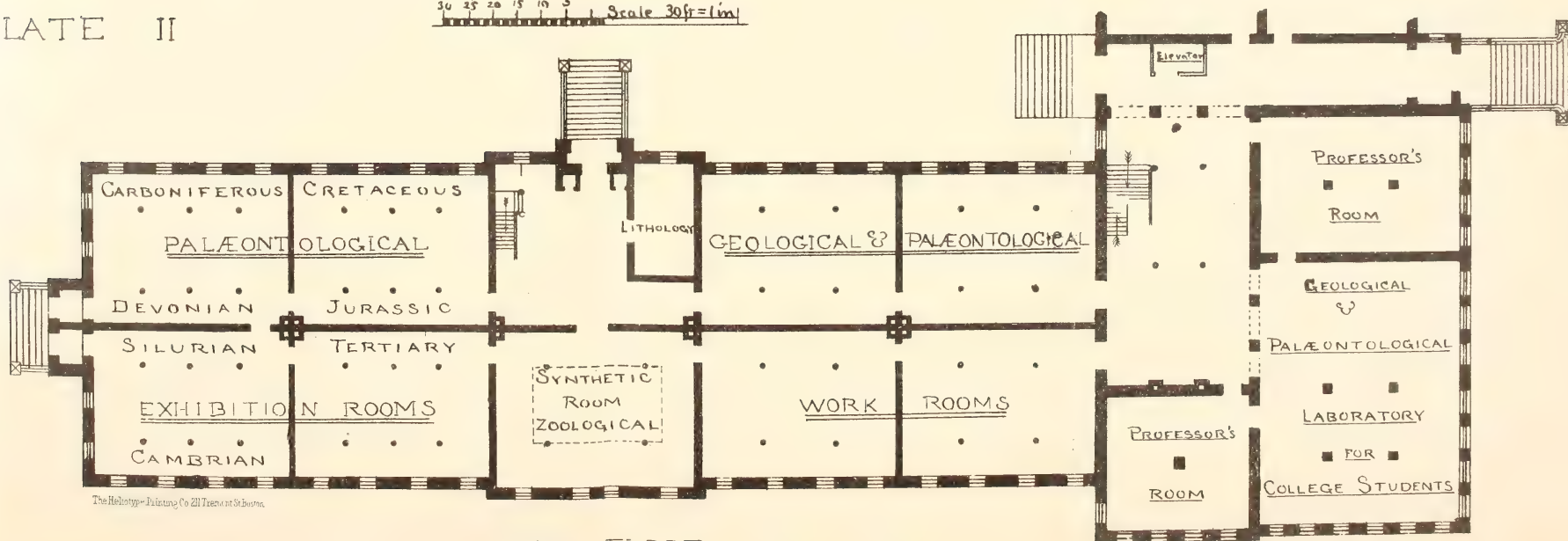
GENERAL PLAN.
SCALE 40 FT. TO 1 IN.



— BASEMENT —

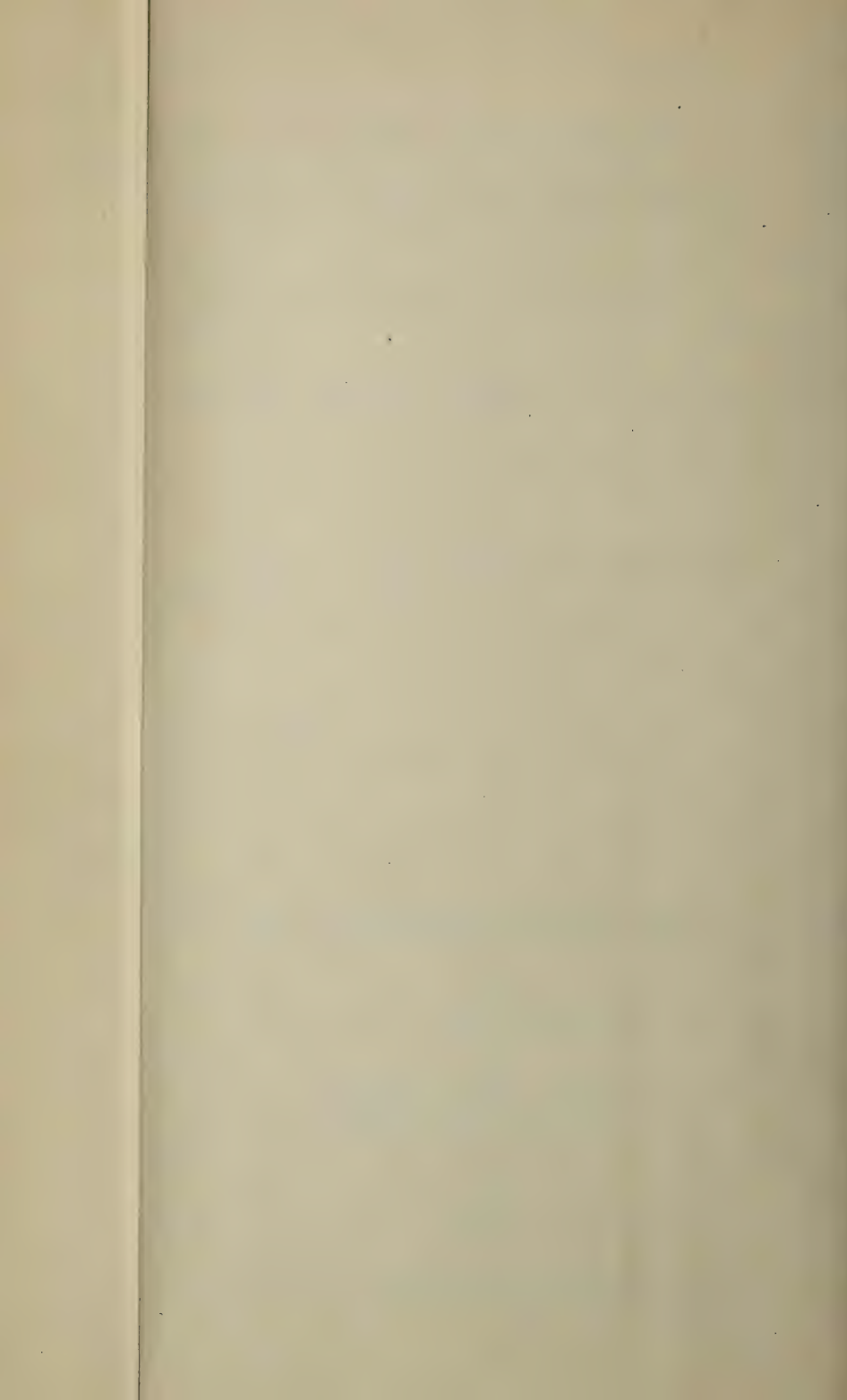
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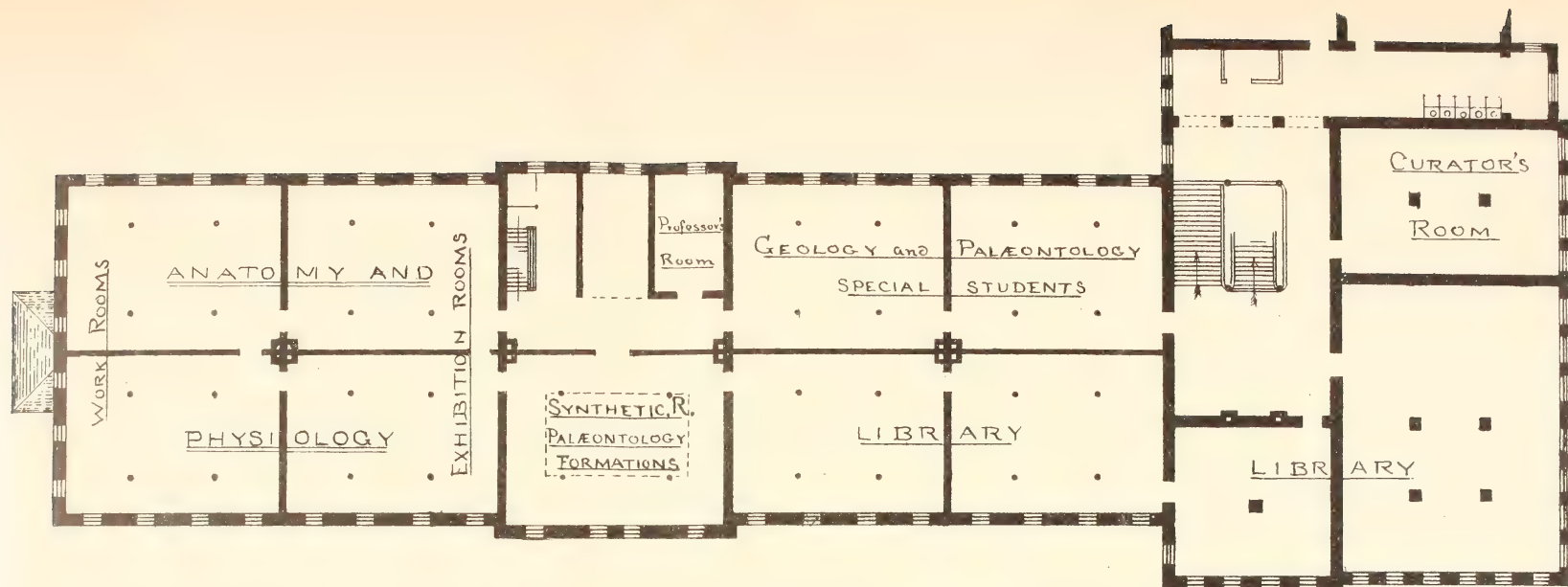
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The Helwig-Printing Co 211 Tremont St Boston

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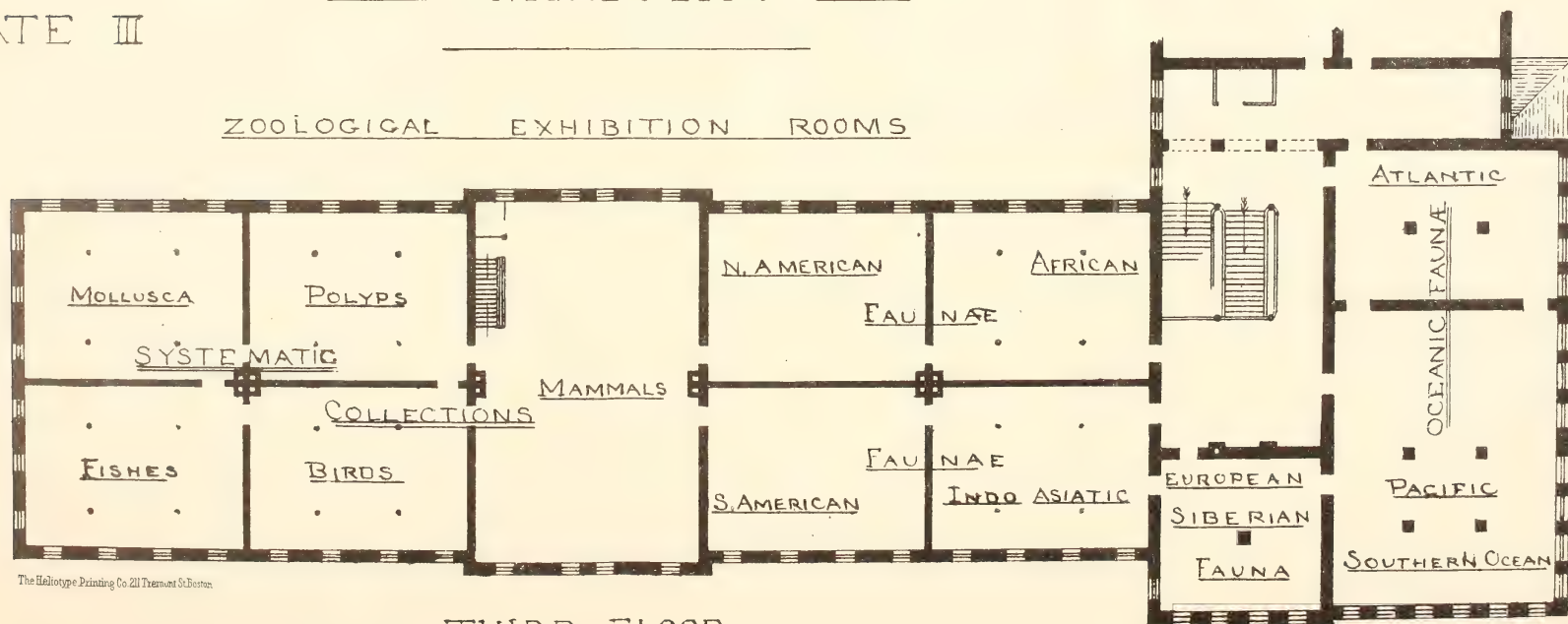




SECOND FLOOR

PLATE III

ZOOLOGICAL EXHIBITION ROOMS



THIRD FLOOR

— EXHIBITION — ROOMS —

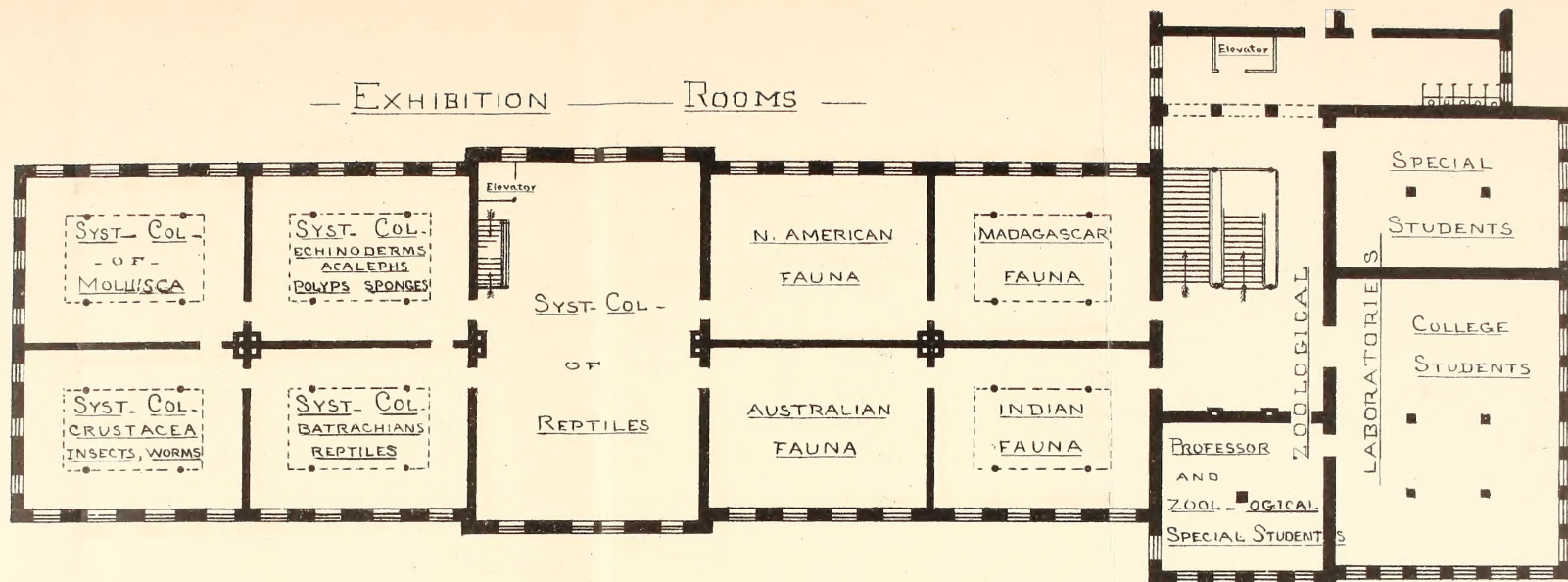
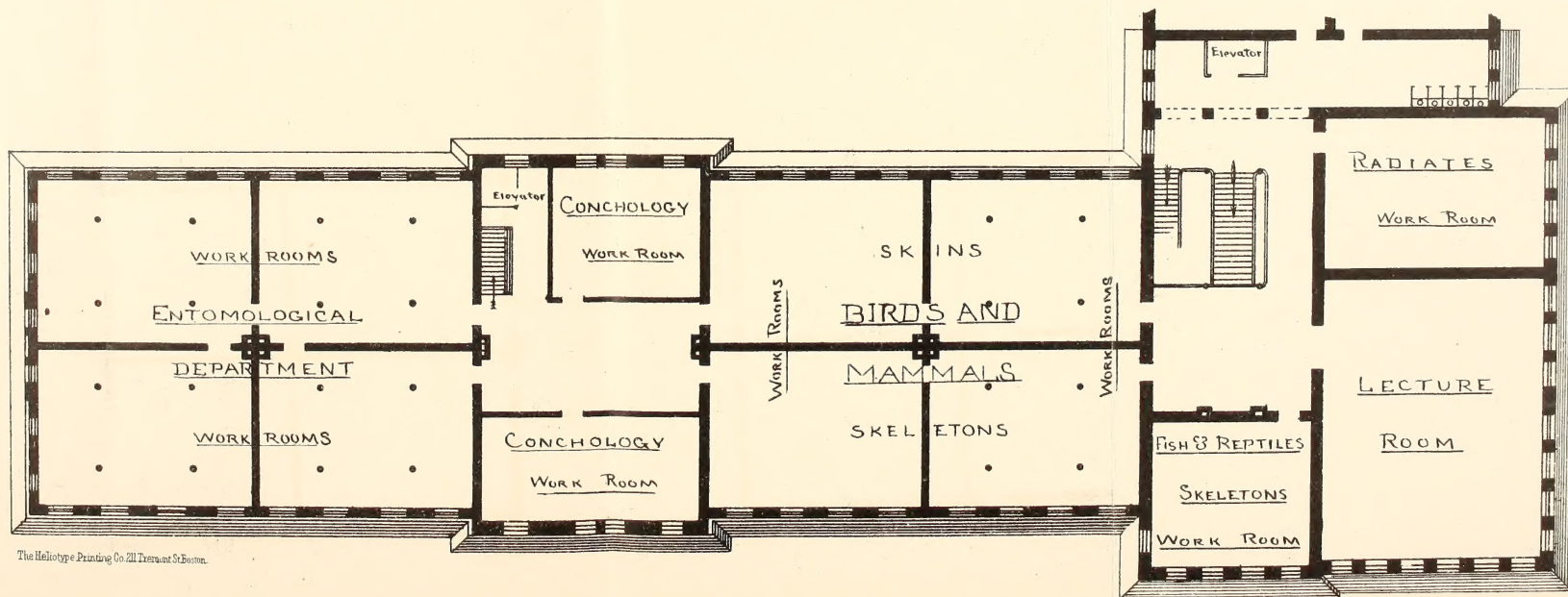


PLATE IV

— FOURTH FLOOR —



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— FIFTH FLOOR —

